

I CLAIM:

1. A method for analyzing a shopping environment, the method comprising the steps of:

tracking a plurality of paths of a plurality of persons in the shopping environment;

recording corresponding path data;

normalizing path data for each path by use of a predetermined normalization function;

calculating a predetermined statistical measure of the normalized shopping data;

and

producing output based upon the predetermined statistical measure.

2. The method of claim 1, wherein the path data includes position data representing a series of tracked positions of a person in the shopping environment, and associated time data representing a corresponding series of times at which the person was tracked in each position.

3. The method of claim 2, wherein the step of normalizing includes time adjusting the time data for each path to a common time reference.

4. The method of claim 3, wherein the step of time adjusting further includes the step of time shifting the time data for each path to a common starting time.

5. The method of claim 3, wherein the step of time adjusting further includes the step of time scaling the time data for each path to a common duration.

6. The method of claim 2, wherein normalizing includes converting path position data from different shopping environments into a common physical frame of reference, to thereby produce normalized position data for the paths.

7. The method of claim 6, further comprising determining standardized shopping environment dimensions.

8. The method of claim 7, further comprising scaling the path position data to the standardized shopping environment dimensions.

9. The method of claim 6, wherein each of the plurality of shopping environments has a longitudinal dimension and a length, a lateral dimension and a width, and the position data for each path includes a plurality of longitudinal and lateral coordinate values, and the step of converting the position data to a standardized frame of reference further includes dividing each longitudinal coordinate value by the length for the corresponding shopping environment, and dividing each lateral coordinate value by the width for the corresponding shopping environment.

10. The method of claim 6, further comprising determining standardized shopping environment sectors.

11. The method of claim 10, further comprising scaling the path position data to the standardized shopping environment dimensions and/or sectors.

12. The method of claim 2, further comprising establishing a calibration for the time data and a calibration for the position data.

13. The method of claim 2, wherein the predetermined normalization function includes determining a proportion of the path completed.

14. The method of claim 13, wherein the proportion is calculated with respect to a distance traveled by the person along the path.

15. The method of claim 13, wherein the proportion is calculated with respect to a time elapsed while the person traveled the path.

16. The method of claim 13, wherein the proportion is calculated with respect to cumulative purchases made while the person traveled the path.

17. The method of claim 1, wherein the step of calculating includes calculating a master path based on a plurality of the paths tracked in the shopping environment.

18. The method of claim 17, wherein the shopping environment has a longitudinal dimension, and each path has a plurality of longitudinal coordinate values, and wherein the calculation of the master path includes averaging longitudinal coordinate values of corresponding points of each path to obtain corresponding average longitudinal coordinate values.

19. The method of claim 17, wherein the shopping environment has a lateral dimension, and each path has a plurality of lateral coordinate values, and wherein the calculation of the master path includes averaging lateral coordinate values of corresponding points of each shopping path to obtain corresponding average lateral coordinate values.

20. The method of claim 2, wherein the step of calculating includes calculating density of a plurality of persons tracked throughout at least a portion of one or more shopping environments.

21. The method of claim 20, wherein the density is based on normalized data received from a plurality of shopping environments.

22. The method of claim 2, wherein the step of calculating includes calculating flow of a plurality of persons traveling throughout at least a portion of one or more shopping environments.

23. The method of claim 22, wherein the flow is based on normalized data received from a plurality of shopping environments.

24. The method of claim 22, wherein the shopping environment has a longitudinal dimension and a lateral dimension, and each shopping path has a plurality of longitudinal coordinate values and a plurality of lateral coordinate values, and wherein the step of calculating further includes, for each shopping path, associating with each selected time a velocity.

25. The method of claim 2, wherein the step of calculating includes calculating shopping intensity of a plurality of shoppers traveling throughout at least a portion of a shopping environment.

26. The method of claim 25, wherein the shopping intensity is based on normalized data received from a plurality of shopping environments.

27. The method of claim 2, wherein normalizing includes determining a standardized shopping environment including sectors and converting the path data from each of a plurality of shopping environments to the standardized shopping environment, and wherein calculating includes examining one or more paths from each of the shopping environments to determine a measure of a predetermined shopper behavior or non-shopper behavior occurring in each of the sectors.

28. The method of claim 27, wherein the shopping environment is partitioned into five sectors.

29. The method of claim 28, wherein the shopping environment has four sides, four corners, and a center, four of the sectors are substantially trapezoidal in shape having two sloping sides and a longer and a shorter of two substantially parallel sides, and the remaining sector is substantially rectangular in shape and having four sides and a center, the sloping sides of the four substantially trapezoidal sectors coinciding with segments of diagonal lines from opposite corners of the shopping environment, the longer of the two substantially parallel sides of each substantially trapezoidal sector coinciding with a side of the shopping environment, and the shorter of the two substantially parallel sides of each substantially trapezoidal sector forming a side of the remaining, substantially rectangular, sector, with the center of the substantially rectangular sector coincident with the center of the shopping environment.

30. The method of claim 27, wherein the shopper behavior is visiting a predetermined region of the shopping environment corresponding to the sector of the standardized shopping environment.

31. The method of claim 27, wherein the shopper behavior is slowing below a predetermined threshold speed in a predetermined region of the shopping environment corresponding to the sector of the standardized shopping environment.

32. The method of claim 27, wherein the shopper behavior is purchasing a product from a predetermined region of the shopping environment corresponding to the sector of the standardized shopping environment.

33. The method of claim 27, wherein the non-shopper behavior is visiting a predetermined region of the shopping environment corresponding to the sector of the standardized shopping environment

34. The method of claim 27, wherein the step of calculating a predetermined statistical measure further includes calculating an ellipse to encompass a predetermined percentage of the shopper behavior or non-shopper behavior.

35. The method of claim 27, wherein the predetermined statistical measure is percentage of trip completion.

36. The method of claim 35, wherein the output includes a contour plot of percentage of trip completion for a plurality of paths.

37. The method of claim 2, wherein the step of calculating further includes the steps of:

calculating a length of the shopping path;

smoothing the shopping path to obtain a smoothed path;

calculating a length of the smoothed path; and

comparing the length of the smoothed path with the length of the shopping path.

38. The method of claim 1, wherein the plurality of persons include a plurality of shoppers.

39. The method of claim 1, wherein the plurality of persons includes a plurality of non-shoppers.

40. The method of claim 1, wherein the plurality of persons includes shoppers and non-shoppers, and the step of calculating a statistical measure includes calculating a statistical measure based on shopper path data and non-shopper path data, the method further comprising, comparing the calculated statistical measures of the shoppers and non-shoppers.



41. A system for use in analyzing a shopping environment, the system comprising:

a computing device configured to receive path data corresponding to a plurality of persons tracked in one or more shopping environments, the path data including position data and time data, and execute an analysis program having a normalization module and a statistical calculation module;

wherein the normalization module is configured to convert the path data to a common time frame of reference and a common physical frame of reference, to thereby produce normalized path data; and

wherein the statistical calculation module is configured to calculate a predetermined statistical measure based on the normalized path data.

42. The system of claim 41, further comprising a shopper tracking module configured to receive shopper path data from a tracking system.

43. The system of claim 42, wherein the tracking system includes sensors configured to track shopper tags throughout each of the shopping environments, to thereby produce the shopper path data.

44. The system of claim 41, further comprising a non-shopper tracking module configured to receive non-shopper path data from a tracking system.

45. The system of claim 44, wherein the tracking system includes sensors configured to track non-shopper tags throughout each of the shopping environments, to thereby produce the non-shopper path data.

46. The system of claim 41, further comprising a product tracking module configured to receive product path data from a tracking system.

47. The system of claim 46, wherein the tracking system includes sensors configured to track product tags throughout each of the shopping environments, to thereby produce the product path data.

48. The system of claim 41, further comprising a environment tracking module configured to receive movable fixture path data from a tracking system.

49. The system of claim 48, wherein the tracking system includes sensors configured to track environment tags throughout each of the shopping environments, to thereby produce the movable fixture path data.

50. The system of claim 41, wherein the predetermined statistical measure is selected from the group consisting of average shopper depth, average shopper right-left position, average shopper path, average shopper density, average shopper velocity, shopping intensity, percent of trip completed, average non-shopper depth, average non-shopper right-left position, average non-shopper path, average non-shopper density, average non-shopper velocity.